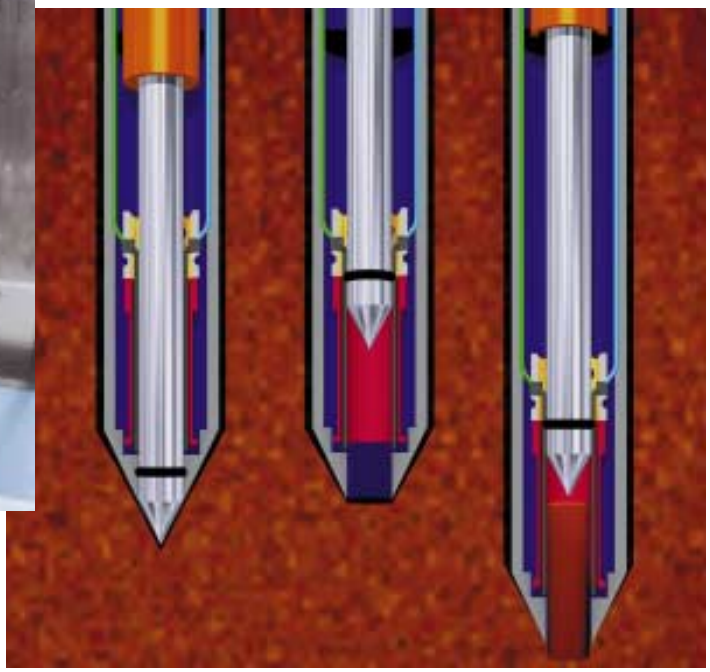
Tri-Service SCAPS Thermal Desorption VOC Sampler

Detection, Identification, and Delineation of VOC Contamination



The Thermal Desorption VOC Sampler can delineate the extent and concentration of volatile organic compounds (VOC) contamination in the vadose zone more quickly and less expensively than traditional drilling and sampling characterization methods.

Traditional methods of site characterization are costly and time consuming. Using the Thermal Desorption VOC Sampler, deployed by the Tri-Service Site Characterization and Analysis Penetrometer System (SCAPS), will result in reduced cost and time in the detection and quantification of soil contamination in the vadose zone and can be used to direct further monitoring and remediation activities. SCAPS and its associated sensors provide the DoD, DOE, EPA, and the private sector with a cost-effective means to rapidly characterize subsurface conditions at contaminated sites through real time, on-site data acquisition and processing.

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Cost-Effective Characterization with Increased Reliability

The use of the SCAPS Thermal Desorption VOC Sampler incorporated into a cone penetrometer results in faster, more detailed site characterization at lower costs than current drilling or sampling methods. Since SCAPS can delineate the extent of the subsurface contamination in situ more accurately than widely spaced monitoring wells and soil borings, the cleanup effort and costs are reduced.

The Thermal Desorption VOC Sampler principle of operation is based on capturing a known volume of soil in situ and heating the soil plug while purging the released VOCs. The Sampler is pushed to the desired ground depth and an interior rod retracts the penetrometer tip. The probe is then pushed further into the soil, collecting a five gram soil plug in the sample chamber. The soil plug is heated, releasing the VOCs. These VOCs are carried to the surface by an inert gas where they are trapped on an adsorbent media.

The trap is then thermally desorbed into an onboard, field portable ion trap mass spectrometer (ITMS) where the contaminants are analyzed in near-real time. The ITMS, using the conditional EPA Method 8265, is capable of detecting most VOCs qualitatively and quantitatively in the sub-ppm range. The soil plug is then expelled from the sample chamber. The sample chamber is heated and purged to remove any residual contamination. This process can be repeated at multiple depths during a single push. Upon completion of the push, grouting of the penetrometer hole is required in order to ensure there is no seepage or cross-layer contamination.

Additionally, the Thermal Desorption Sampler may be used as a vapor sampler in the vadose zone. A vacuum is applied to the transfer line to draw soil vapors to the surface where they are trapped, desorbed, and analyzed by the ITMS in near-real time.

The reliability of in situ, thermal desorption of VOCs from soil in combination with the ITMS has been successfully demonstrated at various sites in conjunction with the Environmental Security Technology Certification Program (ESTCP) and is currently being evaluated by the California Environmental Protection Agency Innovative Environmental Technology Certification Program. A number of field demonstrations have provided, and will continue to provide, direct comparisons between the SCAPS deployed Thermal Desorption VOC Sampler in combination with the ITMS and the standard EPA mandated procedures.

Application of innovative SCAPS field screening technologies, such as the Thermal Desorption VOC Sampler, results in faster, more detailed site characterization at significantly reduced costs compared to traditional methods.

Solutions

For more information on USAEC-ETD technology programs please call the:

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